SWCA
ENVIRONMENTAL CONSULTANTS

SPECIAL-STATUS PLANT SPECIES REPORT

Operator: Anadarko Petroleum Corporation

Project: NBU 1022-9K Well Pad Expansion

Survey Location: Section 9, Township 10 South, Range 22 East; Uintah County, Utah

Survey Type(s): Uinta Basin hookless cactus (*Sclerocactus wetlandicus*)

Survey Date(s): July 10 and 12, 2015

Survey Company: SWCA Environmental Consultants
2028 West 500 North
Vernal, Utah 84078
(435) 789-9388

Project Manager: Jared Bigler

Survey Crew: Stephen Fuller (crew leader), Meghan McCormick, Joseph May, Lucy Parham, and Jason Pierce

Weather:

Date	Temperature Range (°F)	Cloud Cover (%)	Wind Speed (miles per hour)	Precipitation
7/10/2015	80–85	10–80	0–10	Thunder storm
7/12/2015	60–85	5–20	0–5	None

Survey Results:

Total Acres Surveyed:	29.05			
Plant Surveyed for:	**Species**	**Suitable Habitat (acres)**	**Occupied Habitat (acres)**	**No. of Plants Observed**
	Uinta Basin hookless cactus (*Sclerocactus wetlandicus*)	5.45	0	0
Invasive Weeds Observed:	Cheatgrass (*Bromus tectorum*)			
	Halogeton (*Halogeton glomeratus*)			
	Kochia weed (*Bassia scoparia*)			
Noxious Weeds Observed:	Salt-cedar (*Tamarix chinensis*)			

PROPOSED PROJECT

Table 1 provides the basic details of the project.

Table 1. Project Details

Operator Name	Anadarko Petroleum Corporation
Project Description	Expansion of the NBU 1022-9K well pad, and construction of associated well connect pipelines and access road.
Project Location	Section 9, Township 10 South, Range 22 East; Uintah County, Utah
Land Agency	Bureau of Land Management
Historical Impacts	Mineral extraction activities, transportation corridors, agricultural and ranching activities, livestock grazing, and erosion have historically impacted the project area.

PROJECT AREA AND SURVEY AREA DESCRIPTIONS

Table 2 provides descriptions of the project area and survey area, and Figure 1 shows the location of the project area and survey area.

Table 2. Descriptions of Project Area and Survey Area

Project Area	The project area is the area of proposed disturbance by construction activities. The extent of the well pad expansion and proposed access road and pipelines are shown in Figure 1.
Survey Area	The survey area consists of the project area and a 300-foot buffer surrounding the project area. An additional 5 feet was added to the survey buffer to account for variation in topography. Areas on the opposite side of an existing road from the project area were not surveyed. The extent of the survey area is shown in Figure 1.
Underlying Geology	Member B of the Uinta Formation (Tub)
Elevation Range Above Mean Sea Level (amsl)	5164–5210 feet
Topography	The survey area consists of large sandstone outcrops on tall bluffs rolling into a large wash.
Slope Steepness Range	0–20%
Soil Types Present (Web Soil Survey)*	Cadrina extremely stony loam-Rock outcrop complex, 25 to 50 percent slopes, Motto-Casmos complex, 2 to 25 percent slopes
Soils Textures Present	Silty Clay Loam, Sandy Clay Loam
Vegetation Description	Perennial grassland and black sagebrush shrubland typical of the Uinta Basin
Vegetation Communities Present (Southwest Regional Gap Analysis Project)†	Colorado Plateau Pinyon-Juniper Shrubland, Inter-Mountan Basins Big Sagebrush Shrubland, Inter-Mountain Basins Mixed Salt Desert Scrub, Inter-Mountain Basins Semi-Desert Shrub Steppe

Notes:

* Data from Natural Resources Conservation Service (2015).

† Data from U.S. Geological Survey National Gap Analysis Program (2004).

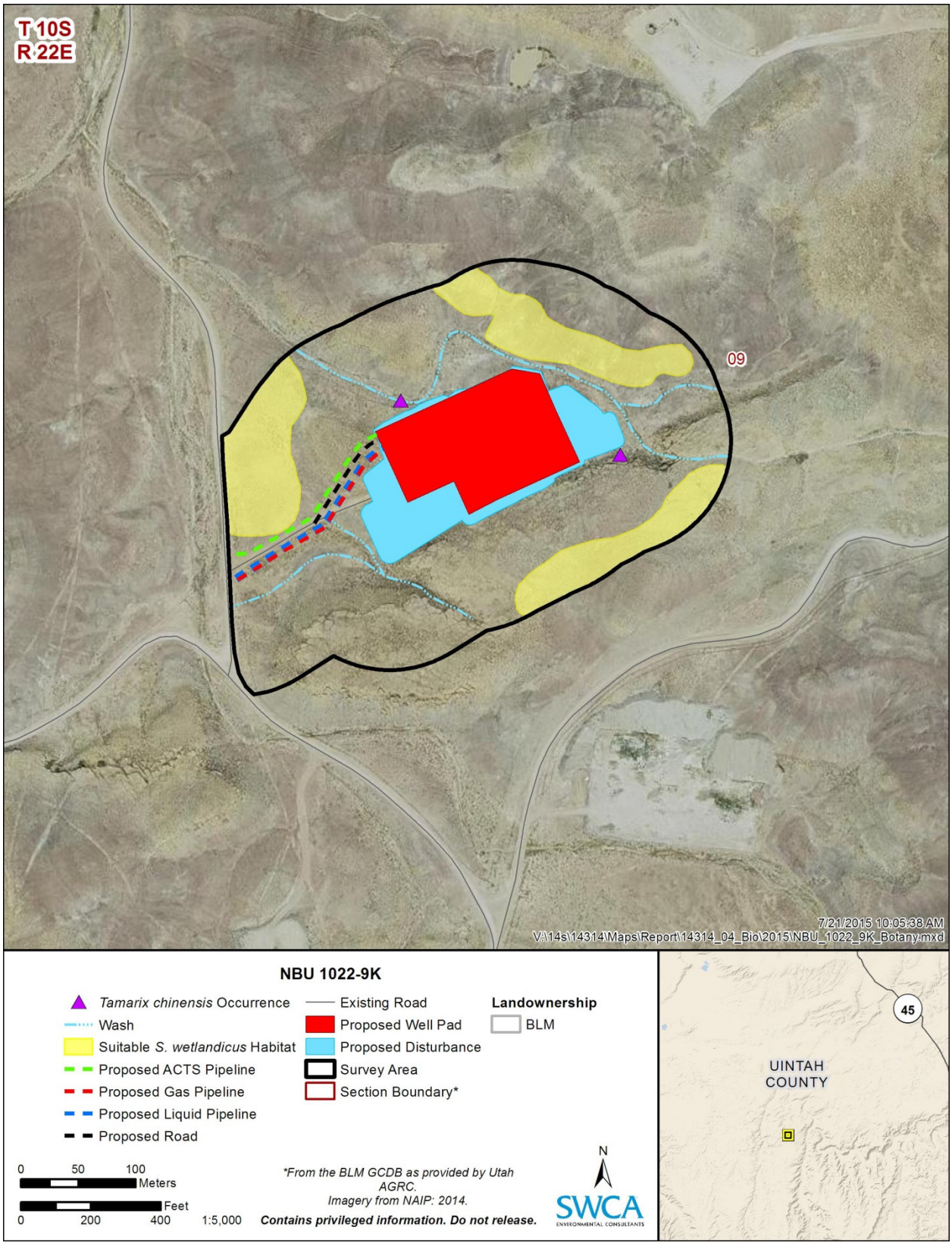

Figure 1. Map of proposed project area and survey area showing noxious weeds observed.

SURVEY METHODOLOGY

The following sources were reviewed for special-status plant data on Uintah and Duchesne Counties:

- The U.S. Fish and Wildlife Service (USFWS) listed species (USFWS 2013)
- The Bureau of Land Management (BLM) Sensitive Plant Species List (BLM 2011)

These sources contain the USFWS list of threatened, endangered, and candidate species as well as the BLM sensitive species list (collectively referred to as special-status species). In addition, the USFWS rare plant potential habitat polygons (USFWS 2013) were reviewed to determine which special-status plant species have the potential to occur in the survey area. Table 3 provides a complete list of special-status plant species in Uintah and Duchesne Counties, and includes the potential for these species to occur in the survey area.

Table 3. Special-Status Plant Species in Uintah and Duchesne Counties

Species Name/ Common Name	Status*	Location/Habitat† (county—location; geologic stratum; plant community; elevation range)	Potential for Occurrence in the Survey Area‡
Aquilegia scopulorum var. *goodrichii* Goodrich's columbine	S	Duchesne—West Tavaputs Plateau; Green River Formation oil shale and marlstone; elevation range unknown.	None. Survey area is out of range for this species.
Arabis vivariensis Park rock cress	S	Uintah—Diamond Mountain, Diamond Gulch; Weber Formation sandstone and limestone; MDS or PJ; 5,000–6,000 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Astragalus equisolensis Horseshoe milkvetch	0	Uintah—Green River Horseshoe Bend; Duchesne River Formation sand and silty sand; MDS; 4,790–5,185 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Astragalus hamiltonii Hamilton milkvetch	S	Uintah—Asphalt Ridge; Mowry, Dakota, and Wasatch Formations, Lapoint and Dry Gulch Members, Duchesne Formation; MDS or PJ; 5,240–5,800 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Cleomella palmeriana var. *goodrichii* Goodrich's cleomella	S	Uintah—Diamond Mountain; Morrison, Mancos, Tropic Formations, heavy clay and shale slopes; SDS; 4,000–6,000 feet amsl.	None. Survey area is out of range for this species.
Cryptantha barnebyi Oilshale catseye	S	Uintah—south and southeast of Bonanza; Evacuation Creek, lower Parachute members, shale slopes, semi-barren; MDS or PJ; 4,600–6,000 feet amsl.	None. Survey area is out of range for this species.
Cryptantha grahamii Graham's catseye	S	Uintah—Green River Formation; shale slopes, semi-barren; MDS or PJ; elevation range unknown.	None. Survey area is out of range for this species.
Erigeron untermannii Untermann fleabane	S	Duchesne, Uintah—West Tavaputs Plateau Green River; Uinta Formation, ridges, dry calcareous shales and sandstones; PJ or MB; 7,000–7,800 feet amsl.	None. Survey area is out of range for this species.
Frasera ackermaniae Ackerman's frasera	S	Uintah—Chinle Formation; recently described species; elevation range unknown.	None. Survey area is out of range for this species.
Hymenoxys lapidicola Rock bitterweed	S	Uintah—Blue Mountain, Cliff Ridge; Weber Formation, sandy ledges and crevices; PJ or ponderosa-manzanita; 5,700–8,100 feet amsl.	None. Survey area is out of range for this species.
Lepidium barnebyanum Barneby's pepperplant	E	Tribal, Duchesne—West Tavaputs Plateau, Indian Canyon; Uinta Formation, white shale outcrops and ridges; barren inclusions in PJ; 6,200–6,500 feet amsl.	None. Survey area is out of range for this species.

Table 3. Special-Status Plant Species in Uintah and Duchesne Counties

Species Name/ Common Name	Status*	Location/Habitat† (county—location; geologic stratum; plant community; elevation range)	Potential for Occurrence in the Survey Area‡
Lepidium huberi Huber pepperplant	S	Uintah—foothills, Ashley Creek, Dry Fork; Chinle, Park City, and Weber Formations, eroding cliffs, alluvium, sandy or shaley bluffs; black sage or MB; 5,000–6,400 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Mentzelia goodrichii Goodrich blazingstar	S	Duchesne—Willow and Argyle Canyons; Green River Formation, steep cliffs, white calcareous shale; open MB; 8,100–8,800 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Penstemon acaulis var. *acaulis* Stemless beardtongue	S	Daggett—Browns Park Formation; ashy, gravelly, or sandy ridges and knolls; sagebrush-desert grass or PJ; 5,840–7,285 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Penstemon gibbensii Gibbens' beardtongue	S	Daggett—Browns Park Formation; Green River Formation, sandy/shaley bluffs, slopes; juniper, thistle, buckwheat, serviceberry; 5,500–6,400 feet amsl.	None. Survey area is out of range for this species.
Penstemon goodrichii Goodrich beardtongue	S	Duchesne, Uintah—Lapoint, Tridell, Whiterocks; Duchesne River Formation; clay badlands; MDS, shadscale saltbush, PJ, or MB; 5,590–6,215 feet amsl.	None. Survey area is out of range for this species.
Penstemon grahamii Graham beardtongue	S	Uintah, Duchesne—oil shale outcrops throughout BLM Vernal Field Office area; Evacuation Creek, lower Parachute members, oil shale or white shale knolls and talus; semi-barren MDS or PJ; 4,600–6,700 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Penstemon scariosus var. *albifluvis* White River beardtongue	S	Uintah—south and southeast of Bonanza; Evacuation Creek, lower Parachute members, shale slopes; semi-barren MDS or PJ; 4,600–6,000 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Phacelia argylensis Argyle Canyon phacelia	S	Duchesne—Argyle Canyon; Green River Formation; elevation range unknown.	None. Survey area is out of range for this species.
Schoenocrambe argillacea Clay reed-mustard	T	Uintah—canyon rims and steep slopes; contact zone, Uinta andGreen River Formations; MDS; 5,000–5,650 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Schoenocrambe suffrutescens Shrubby reed-mustard	E	Duchesne, Uintah—Big Pack Mountain, Wrinkles Road, Hill Creek Basin; Green River Formation, calcareous shale; MDS, PJS, or MB; 5,400–6,000 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Sclerocactus brevispinus Pariette cactus	T	Duchesne, Uintah—Pariette Wash south of Myton; Uinta Formation, Wagonhound Member, alkaline clay; shadscale saltbush, mat-saltbush, greasewood community; 4,700–5,400 feet amsl.	None. Survey area is outside the known range for this species.
Sclerocactus wetlandicus Uinta Basin hookless cactus	T	Duchesne, Uintah—widespread in BLM Vernal Field Office area; alluvial benches Ouray to Carbon County line; MDS; 4,700–6,000 feet amsl.	High. The survey area is within the USFWS potential habitat polygon. The nearest known occurrence is approximately 745 feet from the project area. Formation and associated soils and vegetation communities present in the vicinity of the survey area.
Spiranthes diluvialis Ute ladies'-tresses	T	Daggett, Duchesne, Uintah—unconsolidated alluvium; riparian corridors, wetlands, wet meadows; 4,400–6,810 feet amsl.	None. Riparian habitat is absent in the survey area.

Table 3. Special-Status Plant Species in Uintah and Duchesne Counties

Species Name/ Common Name	Status*	Location/Habitat† (county—location; geologic stratum; plant community; elevation range)	Potential for Occurrence in the Survey Area‡
Thelesperma caespitosum Uinta greenthread	S	Duchesne—West Tavaputs Plateau, north slope Uinta Mountains; Bishop Formation, white shale benches, ridge crests; cushion plant community above PJS and MB; 5,000–9,000 feet amsl.	None. Formation and associated soils do not exist in the survey area.
Townsendia strigosa var. *prolix* Strigose townsendia	S	Duchesne—Duchesne Valley; recently described species.	None. Survey area is out of range for this species.
Yucca sterilis Sterile yucca	S	Duchesne, Uintah—sandy soils near the Green River and Pariette wetlands; elevation range unknown.	Low. No known populations in the area. Formation and associated soils present in the survey area.

Notes:

* Status: C = federal candidate; E = federally endangered; S = BLM sensitive; T = federally threatened; 0 = Non-status, removed from status or potential status.

† Habitat: MB = montane brush; MDS = mixed desert shrub; PJ = pinyon-juniper; PJS = pinyon-juniper-sagebrush; SDS = salt desert scrub.

‡ Occurrence: None = suitable and/or potential habitat for this species is unknown in the survey area; Low = some suitable and/or potential habitat for this species, but populations unknown near survey area; Moderate = substantial suitable and/or potential habitat for this species or known populations near, but unknown in the survey area; High = suitable and/or potential habitat present and populations known in the survey area or immediate proximity.

Before the surveys were conducted, a shapefile of the survey area was created in ArcGIS 10. This file was uploaded to handheld Trimble GeoXT global positioning system (GPS) units, which have an estimated accuracy of less than 1.0 meter (3.3 feet) when data are post-processed.

All surveys were conducted by qualified personnel in compliance with the USFWS protocols (USFWS 2011). In general, plant survey methods used depend on the plant species identified as having potential to occur in the survey area; whether the survey area is within any of the USFWS special-status plant potential habitat polygons; and how recently the survey area has been surveyed for special-status plants in the past. These survey methods are as follows:

- **100% visual coverage surveys** are conducted by walking parallel transects 1–6 feet apart, depending on the topography and habitat of the area, for a 100% visual inspection of the ground surface.
- **Habitat surveys** are conducted by walking parallel transects approximately 10–50 feet apart, depending on topography and habitat. This distance is determined by the surveyors' ability to see the ground in between each other sufficiently to observe the presence or absence of the characteristics of suitable habitat. Where suitable habitat is observed, 100% visual coverage surveys are conducted in these areas.
- **Spot check surveys** are conducted for Uinta Basin hookless cactus and Pariette cactus (*Sclerocactus brevispinus*) if the survey area has already been surveyed for these species within the last 4 years. A reduced effort spot check survey is conducted, as outlined in the memorandum of understanding released by the USFWS in May 2012 (USFWS 2012). Surveys are conducted using meandering transects approximately 10 feet apart (depending on topography and habitat) at a moderately slow speed, with the exception of the following areas, which are inspected thoroughly using the 100% visual coverage survey method:
    - Areas that are within 300 feet and downslope of known *Sclerocactus* plant locations, where seeds are likely to disperse during rain events.
    - Areas within 10 feet of ant mounds and/or colonies.

A comprehensive list of plants observed was recorded during the field survey. *Uinta Basin Flora* (Goodrich 2013) and *A Utah Flora* (Welsh 1987) were the primary resources used in species identification. Suitable habitat for special-status plants was delineated in the survey area if encountered. Suitable habitat is defined as areas that contain or exhibit the specific components or constituents necessary for plant persistence, determined by field inspection and/or surveys, and excluding areas of occupied habitat. Areas on the opposite side of an existing road or well pad from the proposed construction activity or disturbance were not surveyed, as directed by the BLM and USFWS.

SURVEY RESULTS

Figure 1 shows the areas surveyed, the survey methods used in each area, the location of any special-status plants or noxious weeds found, and the areas designated as occupied and suitable habitat. Table 4 shows the plant(s) surveyed for, the type of survey conducted, and what was found.

Table 4. Plants Surveyed For and Survey Type

Plants Surveyed For	100% Visual Survey (acres)	Habitat Survey (acres)	Spot-Check Survey (acres)	Total Area Surveyed (acres)	Occupied Habitat (acres)	Suitable Habitat (acres)	No. of Individual Plants Observed
Uinta Basin hookless cactus	29.05	0	0	29.05	0	5.45	0

Table 5 is a comprehensive list of all plant species observed during the survey.

Table 5. Plant Species Observed in the Survey Area

Perennial Grassland (Silty Clay Loam Soils)			Black sagebrush Shrubland (Sandy Clay Loam Soils)		
Common Name	**Scientific Name**	**Abundance***	**Common Name**	**Scientific Name**	**Abundance***
	Trees/Shrubs			**Trees/Shrubs**	
Black sagebrush	*Artemisia nova*	O	Black sagebrush	*Artemisia nova*	D
Shadscale saltbush	*Atriplex confertifolia*	O	Shadscale saltbush	*Atriplex confertifolia*	C
Gardner's saltbush	*Atriplex gardneri*	C	Littleleaf brickellbush	*Brickellia microphylla*	C
Torrey Mormon tea	*Ephedra torreyana*	R	Yellow rabbitbrush	*Chrysothamnus viscidiflorus*	R
Rubber rabbitbrush	*Ericameria nauseosa*	C	Rubber rabbitbrush	*Ericameria nauseosa*	R
Broom snakeweed	*Gutierrezia sarothrae*	C	Slender buckwheat	*Eriogonum microthecum*	R
Bud sagebrush	*Picrothamnus desertorum*	R	Broom snakeweed	*Gutierrezia sarothrae*	C
Greasewood	*Sarcobatus vermiculatus*	R	White sage	*Krascheninnikovia lanata*	R
Nuttall's horsebrush	*Tetradymia nuttallii*	O	Bud sagebrush	*Picrothamnus desertorum*	O

Table 5. Plant Species Observed in the Survey Area

Perennial Grassland (Silty Clay Loam Soils)			Black sagebrush Shrubland (Sandy Clay Loam Soils)		
Common Name	**Scientific Name**	**Abundance***	**Common Name**	**Scientific Name**	**Abundance***
	Forbs		Skunkbush	*Rhus aromatica*	R
Milkvetch	*Astragalus* sp.	O	Greasewood	*Sarcobatus vermiculatus*	O
Fendler euphorb	*Chamaesyce fendleri*	O	Salt-cedar	*Tamarix chinensis*‡	R
Sego lilly	Calochortus nuttallii	R	Shortspine horsebrush	*Tetradymia spinosa*	O
Cryptantha	*Cryptantha sp.*	O		**Forbs**	
Tufted evening primrose	*Oenothera caespitosa*	R	Milkvetch	*Astragalus* sp.	O
Plains prickly pear	*Opuntia polyacantha*	O	Green molly	*Bassia americana*	R
Twinpod	*Physaria sp.*	O	Kochia weed	*Bassia scoparia*†	O
Scarlet globemallow	*Sphaeralcea coccinea*	C	Sego lilly	Calochortus nutallii	R
	Grasses		Uinta Basin gilia	*Gilia stenothyrsa*	O
Indian ricegrass	*Achnatherum hymenoides*	C	Halogeton	*Halogeton glomeratus*†	O
Purple three-awn	*Aristida purpurea*	O	Mountain peperplant	*Lepidium montanum*	O
Blue grama	*Bouteloua gracilis*	R	Common prickly phlox	*Leptodactylon pungens*	O
Cheatgrass	*Bromus tectorum*†	R	Hoary aster	*Machaeranthera canescens*	R
Galleta	*Hilaria (Pleuraphis) jamesii*	D	Narrowleaf umbrellawort	*Mirabilis linearis*	R
Sand dropseed	*Sporobolus cryptandrus*	R	Plains prickly pear	*Opuntia polyacantha*	O
			Rock goldenrod	*Petradoria pumila*	O
			Twinpod	*Physaria sp.*	R
			Basindaisy	*Platyschkuhria integrifolia*	C
				Grasses	
			Indian ricegrass	*Achnatherum hymenoides*	C
			Crested wheatgrass	*Agropyron cristatum*	R
			Purple three-awn	*Aristida purpurea*	O
			Blue grama	*Bouteloua gracilis*	O
			Cheatgrass	*Bromus tectorum*†	C
			Saltgrass	*Distichlis spicata*	R
			Needle and thread	*Hesperostipa comata*	C
			Galleta	*Hilaria jamesii*	O

Table 5. Plant Species Observed in the Survey Area

Perennial Grassland (Silty Clay Loam Soils)			Black sagebrush Shrubland (Sandy Clay Loam Soils)		
Common Name	**Scientific Name**	**Abundance***	**Common Name**	**Scientific Name**	**Abundance***
			Sandberg bluegrass	*Poa secunda*	R
			Bluebunch wheatgrass	*Pseudoroegneria spicata*	R
			Alkali saccaton	*Sporobolus airoides*	R

Notes:

* Abundance: D = Dominant; C = Common; O = Occasional; R = Rare.

† Invasive species

‡ State-designated noxious weed species

Plant names are from Uinta Basin Flora Draft Revision Jan. 2013 (Goodrich 2013)

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